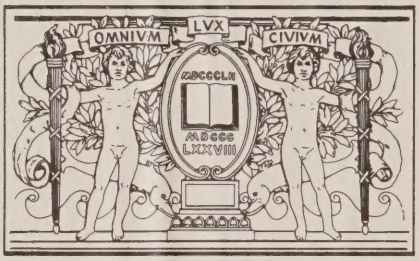
GOVT. DOC
A
M3/B16
RA
84/18



BOSTON
PUBLIC
LIBRARY

Gov. 96-1182

GOVERNMENT DOCUMENTS
DEPARTMENT
BOSTON PUBLIC LIBRARY

REPORT ON THE RESEARCH DEPARTMENT'S USE OF THE MASSACHUSETTS ECONOMIC POLICY ANALYSIS MODEL

To Project Boston Employment by
Industry and Occupation

NB/B16
RA
84/18

Jeffrey P. Brown

Boston Redevelopment Authority
Research Department

September 1984

Raymond L. Flynn, Mayor
City of Boston

Stephen Coyle, Director
Boston Redevelopment Authority

Alexander Ganz
Research Director

Boston Redevelopment Authority
Board of Directors
Robert L. Farrell, Chairman
Joseph J. Walsh, Vice-Chairman
James K. Flaherty, Treasurer
Clarence Jones, Asst. Treasurer
William A. McDermott, Jr., Member
Kane Simonian, Secretary

BOSTON PUBLIC LIBRARY
GOVERNMENT DOCUMENTS
DEPARTMENT

Introduction

This is a progress report on the Research Department's use of the Massachusetts Economic Policy Analysis (MEPA) model. During the twelve-month contractual period, MEPA has developed new components to its econometric forecasting model to meet our specifications. We have used the University of Massachusetts' computer and consulted with the MEPA staff to produce adjusted versions of the model. This report reviews the model development, presents preliminary projections for Suffolk County and the five-county metropolitan region, and outlines the next steps in modification and use of the MEPA model.

Model Development

The MEPA project fulfilled the terms of its contract for professional services by (1) refining the MEPA model to include 53 industrial sectors and to project employment and income for Suffolk County and for a geographic area encompassing Suffolk, Essex, Middlesex, Norfolk and Plymouth counties; (2) providing the Research Department with unlimited on-line access to the MEPA county model and to the full Massachusetts model; and (3) consulting with the Research Department as needed.

The 53-sector county model provides valuable detail on non-manufacturing sectors. This expansion of the model allows us to review and, if necessary, adjust the projections for each individual sector (2-digit SIC level). Consequently, we can analyze projected trends in particular sectors and produce a more reliable projection for all sectors combined. The major hitch in the 53-sector model is the incidence of withheld data in some sectors. For example, disclosure

Digitized by the Internet Archive
in 2025 with funding from
Boston Public Library

https://archive.org/details/reportonresearch00bost

laws prevent MEPA from printing the historical (1981) and projected (1982-1995) employment in hotels (SIC 70). The actual data in the hotel sector are used in the model to produce the projections for all sectors, but the results for the hotel sector cannot be printed.

The five-county projections and the Suffolk County projections are valuable for analytic purposes because our information bases (notably, those from the U.S. Department of Commerce) cover the same geographic areas. Fortunately, the City of Boston nearly coincides with Suffolk County, and the five counties represent the Boston Metropolitan Area fairly well.

We had success with the on-line access to the MEPA models via the University of Massachusetts. Charges for computer use amounted to about $2,000 for the twelve-month period.

The MEPA staff's refinements of the model took several months, but once the model was ready, the process of producing projections went smoothly. Telephone consultations and a full day at the MEPA offices were instrumental in our adjustments to the model and subsequent projections.

Our adjustments to the MEPA model involved four steps. First, we added employment data for most sectors for 1982 and 1983. The MEPA model incorporates this "partial data" into the projections to produce results that are consistent with the most recent information. Second, we adjusted the "area wage mults" to compensate for a quirk in the 1981 Suffolk County wage data. Third, we adjusted the growth rates for selected sectors to reflect our expectations about particular development projects (office, hotel, retail, etc.) in the next three to five years. Fourth, we changed the 1982 personal income amounts in the

Suffolk County and Metro Area models (using the simulation procedure) to incorporate the 1982 personal income by county from the Bureau of Economic Analysis.

After those adjustments, the models were ready to produce preliminary forecasts for employment, income and occupations for Suffolk County and the Metro Area.

Products from the Model

The preliminary projections from the adjusted models are presented in Tables 1 and 2. In Suffolk County, the average annual percent change in employment would be 1.8 for 1982-1990 and 0.9 for 1990-1995 (see Table 1). The fastest-growing sectors in the 1982-1990 period would be instrument manufacturing, chemicals, business services, miscellaneous manufacturing and fabricated metals. In terms of absolute numbers, the most new jobs will come from business services (11,000), medical services (8,000) and retail trade (5,000). After 1990, lower rates of growth would prevail in all sectors.

For the Metro Area, the average annual percent change in total employment would be 2.5 for 1982-1990 and 1.5 for 1990-1995 (see Table 2). Growth in durable goods manufacturing would be substantial, especially in non-electrical machinery (49,000), electrical equipment (35,000) and instruments (29,000). Primary metals would also have a large rate of growth (33 percent). Business services would expand by 43,000 jobs (42 percent), medical services by 32,000 (21 percent) and retail trade by 35,000 (12 percent). During the 1990-1995 period, growth would subside somewhat.

Those employment projections imply projections of jobs by occupation. In Tables 3 and 4, employment by occupation for selected years are presented for Suffolk County and the Metro Area. Note that, by 1995, the occupations with the most employment in Suffolk County will be general clerical and kindred (110,000), general administrators (42,600), secretaries (40,000), general operatives (34,000) and protective services workers (32,000) (see Table 3). In the Metro Area, the chief occupations in 1995 would be the same as those in Suffolk County, with the exceptions of sales workers and food service workers edging out protective service workers (see Table 4).

The extensive printouts from the MEPA model are only summarized by these four tables. Furthermore, the MEPA model may be used to simulate a large variety of policy changes. For example, given a policy that would add 200 employees above the "business as usual" employment level in a certain sector, the model will recompute a forecast that incorporates that change.

Table 1

EMPLOYMENT BY INDUSTRY
Suffolk County

Industry	1982	1985	1990	1995	Change 1982-1990		Change 1990-1995	
					Number	Percent	Number	Percent
Total Wage & Salary Employment	542,995	573,221	621,516	649,745	78,521	14.5	28,229	4.5
Manufacturing	53,113	54,223	58,996	61,515	5,883	11.1	2,519	4.3
Durables	20,069	21,372	25,232	28,049	5,163	25.7	2,817	11.2
Furniture	940	948	952	909	12	1.3	-43	-4.5
Stone, Clay, Glass	480	458	522	568	42	8.8	46	8.8
Primary Metals	861	908	918	844	57	6.6	-74	-8.1
Fabricated Metals	6,323	6,777	7,861	8,685	1,538	24.3	824	10.5
Non-Electric Machinery	4,249	3,813	4,374	4,735	125	2.9	361	8.3
Electrical Equipment	2,138	2,098	2,102	2,010	-36	-1.7	-92	-4.4
Instruments	2,354	3,019	4,666	6,105	2,312	98.2	1,439	30.8
Misc. Manufacturing	1,475	1,762	1,844	1,825	369	25.0	-19	-1.0
Non-Durables	33,044	32,851	33,765	33,465	721	2.2	-300	-0.9
Food	5,332	5,075	3,970	3,037	-1,362	-25.5	-933	-23.5
Apparel	7,308	7,525	8,280	8,107	972	13.3	-173	-2.1
Paper	1,472	1,511	1,436	1,307	-36	-2.4	-129	-9.0
Printing	12,252	11,826	12,131	12,251	-121	-0.9	120	1.0
Chemicals	2,662	2,972	3,691	4,234	1,029	38.7	633	17.1
Petroleum Products	227	227	227	227	0	0.0	0	0.0
Leather	1,354	1,173	1,117	1,020	-237	-17.5	-97	-8.7
Agriculture, Forestry, Fisheries	520	520	520	520	0	0.0	0	0.0
Construction	11,017	11,485	12,341	13,332	1,324	12.0	991	8.0

Table 1 (continued)

EMPLOYMENT BY INDUSTRY
Suffolk County

Industry	1982	1985	1990	1995	Change 1982-1990		Change 1990-1995	
					Number	Percent	Number	Percent
Transportation & Public Utilities	35,865	36,429	35,578	36,355	-287	-0.8	777	2.2
Railroad	862	839	738	676	-124	-14.4	-62	-8.4
Trucking	4,061	3,913	3,799	3,537	-262	-6.5	-262	-6.9
Local/Inter-urban	2,245	1,834	1,515	1,405	-730	-32.5	-110	-7.3
Air Transportation	R	R	R	R	-	-	-	-
Other Transportation	2,945	2,615	2,332	2,190	-613	-20.8	-142	-6.1
Communication	R	R	R	R	-	-	-	-
Public Utilities	4,364	4,151	3,668	3,468	-696	-15.9	-200	-5.5
Finance, Insurance, Real Estate	76,211	R	R	R	-	-	-	-
Banking	18,859	19,489	19,985	19,881	1,126	6.0	-104	-0.5
Insurance	34,407	34,545	36,064	34,966	1,657	4.8	-1,098	-3.0
Retail Trade	60,223	63,100	65,516	67,433	5,293	8.8	1,917	2.9
Wholesale Trade	27,504	26,798	23,614	21,856	-3,890	-14.1	-1,758	-7.4
Services	197,322	R	R	R	-	-	-	-
Hotels	R	R	R	R	-	-	-	-
Personal Services & Repair	4,855	5,195	5,087	4,994	232	4.8	-93	-1.8
Auto Repair/Services	4,219	4,842	5,053	5,200	834	19.8	147	2.9
Misc. Business Services	33,082	38,490	44,447	49,455	11,365	34.4	5,008	11.3
Amusement & Recreation	2,829	3,159	3,222	3,213	393	13.9	-9	-0.3
Motion Picture	1,248	1,324	1,341	1,244	93	7.4	-97	-7.2
Medical	57,071	60,780	65,169	66,509	8,098	14.2	1,340	2.1

Source: MEPA Model and Bureau of Economic Analysis.

Table 2

EMPLOYMENT BY INDUSTRY
Metro Area

Industry	1982	1985	1990	1995	Change 1982-1990		Change 1990-1995	
					Number	Percent	Number	Percent
Total Wage & Salary Employment	1,897,339	1,996,985	2,275,677	2,447,622	378,338	19.9	171,945	7.6
Manufacturing	405,107	448,860	533,837	586,025	128,730	31.8	52,188	9.8
Durables	281,999	325,945	410,382	468,759	128,383	45.5	58,377	14.2
Furniture	R	R	R	R	-	-	-	-
Stone, Clay, Glass	3,640	4,031	4,407	4,582	767	21.1	175	4.0
Primary Metals	6,063	6,429	8,033	8,801	1,970	32.5	768	9.6
Fabricated Metals	22,554	24,846	26,839	27,411	4,285	19.0	572	2.1
Non-Electric Machinery	68,987	82,864	118,193	150,152	49,206	71.3	31,959	27.0
Electrical Equipment	90,540	107,590	125,422	136,871	34,882	38.5	11,449	9.1
Instruments	50,858	56,875	80,008	93,521	29,150	57.3	13,513	16.9
Misc. Manufacturing	6,249	6,931	7,534	7,615	1,285	20.6	81	1.1
Non-Durables	123,108	122,915	123,455	117,266	347	0.3	-6,189	-5.0
Food	R	R	R	R	-	-	-	-
Apparel	16,065	16,658	17,793	16,688	1,728	10.8	-1,105	-6.2
Paper	11,633	11,528	11,018	10,138	-615	-5.3	-880	-8.0
Printing	30,973	33,305	35,009	35,673	4,036	13.0	664	1.9
Chemicals	10,228	10,160	10,319	10,314	91	0.9	-5	-0.1
Petroleum Products	1,176	1,050	1,206	1,307	30	2.6	101	8.4
Leather	14,796	13,768	14,473	13,669	-323	-2.2	-804	-5.9
Agriculture, Forestry, Fisheries	R	R	R	R	-	-	-	-
Construction	55,856	60,334	67,534	72,994	11,678	20.9	5,460	8.1

Table 2 (continued)

EMPLOYMENT BY INDUSTRY
Metro Area

Industry	1982	1985	1990	1995	Change 1982-1990		Change 1990-1995	
					Number	Percent	Number	Percent
Transportation & Public Utilities	87,719	R	R	R	-	-	-	-
Railroad	2,930	2,550	2,132	1,898	-798	-27.2	-234	-11.0
Trucking	R	R	R	R	-	-	-	-
Local/Inter-urban	9,695	9,429	9,369	9,581	-326	-3.3	212	2.3
Air Transportation	R	R	R	R	-	-	-	-
Other Transportation	R	R	R	R	-	-	-	-
Communication	R	R	R	R	-	-	-	-
Public Utilities	11,679	11,458	11,143	11,207	-536	-4.6	64	0.6
Finance, Insurance, Real Estate	131,519	R	R	R	-	-	-	-
Banking	39,486	40,211	43,629	45,422	4,143	10.5	1,793	4.1
Insurance	53,552	55,307	61,234	62,397	7,682	14.3	1,163	1.9
Retail Trade	301,880	303,416	336,716	360,580	34,836	11.5	23,864	7.1
Wholesale Trade	96,592	103,154	106,696	110,252	10,104	10.5	3,556	3.3
Services	525,387	R	R	R	-	-	-	-
Hotels	R	R	R	R	-	-	-	-
Personal Services & Repair	22,727	25,236	27,144	27,970	4,417	19.4	826	3.0
Auto Repair/Services	11,856	12,996	14,087	14,929	2,231	18.8	842	6.0
Misc. Business Services	102,795	118,924	145,489	166,946	42,694	41.5	21,457	14.7
Amusement & Recreation	11,228	11,722	13,127	13,917	1,899	16.9	790	5.7
Motion Picture	R	R	R	R	-	-	-	-
Medical	150,813	161,440	183,059	194,893	32,246	21.4	11,834	6.5

R = Data not published due to disclosure restrictions.

Source: MEPA Model and Bureau of Economic Analysis.

TABLE 3

SUFFOLK COUNTY FORECAST WITH PERSONAL INCOME ADJUSTMENT 8-1

EMPLOYMENT BY OCCUPATION

	1982	1983	1984	1985	1990	1995
AERONAUT. ENGINEERS	.169	.172	.182	.191	.239	.259
CHEMICAL ENGINEERS	.199	.201	.211	.220	.263	.298
CIVIL ENGINEERS	1.395	1.404	1.468	1.521	1.777	1.988
ELEC. ENGINEERS	1.660	1.712	1.767	1.814	2.033	2.229
IND. ENGINEERS	.947	.952	.984	1.016	1.135	1.250
MECH. ENGINEERS	.878	.876	.921	.960	1.139	1.272
METAL & MTRLS ENGNRS	.053	.053	.055	.058	.068	.074
MINING-PETRO ENGNRS	.046	.046	.048	.050	.059	.066
SALES & NEC ENGNRS	1.164	1.177	1.228	1.274	1.487	1.649
COMPUTER PROGRAMMERS	2.110	2.153	2.213	2.275	2.551	2.741
COMPUTER ANALYSTS	1.312	1.338	1.377	1.417	1.594	1.721
CMPTR SPCLSTS & NEC	.248	.254	.262	.270	.305	.332
HEALTH TECHNOLOGISTS	4.178	4.265	4.376	4.457	4.833	4.963
NURSES, THERPSTS....	9.873	10.069	10.319	10.500	11.324	11.590
PHYS. ,DENT.....	5.256	5.368	5.496	5.588	5.989	6.117
AGRI BIO TECHNICIANS	.206	.210	.211	.214	.227	.233
CHEMICAL TECHNICIANS	.284	.288	.301	.312	.373	.419
DRAFTSMEN	2.227	2.247	2.377	2.489	2.988	3.376
ELECTRCL TECHNICIANS	1.048	1.075	1.102	1.130	1.263	1.368
INDUST ENGNR TECHNCS	.085	.085	.088	.091	.103	.112
MECH. ENG. TECH.	.037	.036	.039	.041	.049	.055
MATH TECHNICIANS	.014	.014	.014	.014	.016	.017
NEC TECHNICIANS	1.976	2.004	2.098	2.181	2.584	2.890
PRE K. K-6 TEACHERS	4.784	5.006	5.018	5.146	7.056	7.530
7-12 TEACHERS	4.916	5.128	5.156	5.302	7.045	7.506
EDITORS + REPORTERS	1.789	1.765	1.797	1.825	1.989	2.015
PUBLIC RELATIONS	1.151	1.182	1.210	1.234	1.340	1.413
NEC WRITERS & ARTSTS	7.241	7.488	7.765	8.030	9.201	10.000
RELIGIOUS WORKERS	3.022	3.057	3.183	3.284	3.331	3.164
SOCIAL SCIENTISTS	2.361	2.405	2.468	2.531	2.844	3.049
SOC & REC WORKERS	5.532	5.602	5.772	5.858	6.198	6.242
POST-SEC TEACHERS	1.715	1.797	1.799	1.846	2.550	2.728
ACCOUNTANTS	10.180	10.320	10.730	11.105	12.800	14.043
AIRLINE TECHNICIANS	1.415	1.417	1.450	1.473	1.573	1.647
ARCHITECTS	.993	1.007	1.082	1.148	1.440	1.658
FARM AND ENVIRONMENT	.399	.400	.404	.411	.455	.486
LAWYERS AND JUDGES	7.975	8.042	8.502	8.904	10.743	12.159
LIBRARIANS	.687	.708	.719	.737	.925	.981
BIO & PHYS SCIENTSTS	1.852	1.877	1.945	2.010	2.333	2.554
MATH SPECIALISTS	.494	.496	.508	.521	.580	.610
SYSTEMS ANALYSTS	.734	.739	.758	.778	.868	.927
LABOR RELATION WRKRS	4.280	4.401	4.516	4.632	5.135	5.551
NEC RSRCH WRKRS	.920	.943	.975	1.008	1.199	1.309
NEC TECHNCS & ENGNRS	1.316	1.324	1.347	1.368	1.487	1.607
VOCATNL & ED CNSLRS	.794	.816	.826	.845	1.061	1.132

84/08/01

SUFFOLK COUNTY FORECAST WITH PERSONAL INCOME ADJUSTMENT G-1

EMPLOYMENT BY OCCUPATION
(CONTINUED)

	1982	1983	1984	1985	1990	1995
FINANCIAL MANAGERS	7.056	7.294	7.285	7.385	7.716	7.940
FARM PRODUCTS MANGRS	.134	.139	.134	.130	.114	.104
WHOLSL & RETL BUYERS	.707	.733	.725	.719	.694	.675
HEALTH ADMINISTRATRS	1.568	1.600	1.641	1.669	1.790	1.827
INSPECTORS	2.201	2.184	2.214	2.247	2.451	2.650
NEC PUBLC ADMNSTRTRS	5.843	5.798	5.877	5.964	6.490	7.030
RAILROAD CONDUCTORS	.061	.060	.061	.060	.052	.048
RESTAURANT MANAGERS	3.279	3.394	3.398	3.426	3.649	3.895
SALES MANAGERS	3.116	3.188	3.202	3.217	3.275	3.292
COLLEGE ADMNSTRTRS	.165	.173	.174	.178	.246	.263
1-12 SCHOOL ADMINS	.808	.847	.848	.870	1.202	1.286
NEC ADMINISTRATORS	36.834	37.827	38.554	39.094	41.216	42.602
SALES & ADVERT AGNTS	1.011	1.049	1.076	1.102	1.196	1.289
INSURANCE AGENTS	11.986	11.793	11.894	12.052	12.591	12.228
REAL ESTATE AGENTS	4.284	4.433	4.878	5.128	5.847	6.605
STOCK & BOND BROKRS	1.474	1.567	1.549	1.586	1.715	1.813
NEC SALES WORKERS	17.970	18.530	18.540	18.546	18.618	18.552
INSURANCE ADJUSTERS	3.521	3.469	3.499	3.546	3.714	3.619
INFO PROCESS WRKRS	7.439	7.572	7.727	7.893	8.624	9.102
SECRETARIES	32.081	32.593	33.496	34.322	38.137	40.372
NEC CLERICL & KINDRD	93.368	95.261	96.671	98.216	105.670	110.088
ELECTRIC LINEMEN	.421	.425	.418	.409	.377	.368
ELECTRICIANS	1.767	1.782	1.820	1.839	1.971	2.093
TELEPHONE INSTALLERS	3.620	3.923	3.961	3.979	4.089	4.346
NEC CONSTRUCTION	9.205	9.365	9.592	9.678	10.467	11.059
FORGE- & HAMMER-MEN	.045	.043	.045	.047	.053	.057
FURNITURE FINISHERS	.062	.063	.064	.065	.066	.065
LOCOMOTIVE ENGINEERS	.100	.097	.100	.098	.088	.082
MACHINISTS	1.226	1.175	1.221	1.255	1.397	1.502
REPAIR & MECHANICS	14.363	14.743	14.985	15.160	15.940	16.340
PRINTING TRADES	2.993	2.867	2.905	2.937	3.046	3.097
SHEET METAL WORKERS	.437	.433	.450	.462	.514	.557
TOOL AND DIE MAKERS	.361	.336	.357	.372	.434	.479
NEC CRAFTSMEN	11.905	11.953	12.188	12.343	13.027	13.560
MACHINE OPERATIVES	.738	.672	.712	.740	.851	.931
TEXTILE OPERATIVES	.342	.319	.352	.374	.459	.473
NEC OPERATIVES	30.103	29.705	30.610	31.180	33.236	34.126
MASS TRANSIT WORKERS	1.597	1.514	1.442	1.383	1.267	1.248
RAILROAD BRAKEMEN	.165	.161	.164	.161	.143	.136
TRUCK DRIVERS	6.972	7.007	6.968	6.955	6.965	6.875
NEC TRANSIT OPER'S	4.691	4.748	4.717	4.685	4.579	4.533
CONSTRUCT LABORERS	2.187	2.219	2.267	2.273	2.424	2.592
OTHER LABORERS	14.819	15.036	15.173	15.261	15.709	16.026
CLEANING WORKERS	17.545	18.287	18.835	19.298	21.512	22.707
FOOD SERVICE WORKERS	23.104	23.978	24.142	24.378	26.144	27.566
HEALTH ASSTS	16.584	16.920	17.352	17.655	18.947	19.349
PERSONAL SERVICE	9.606	10.099	10.422	10.564	11.[illegible]	11.[illegible]
PRIV HH WORKERS	1.908	1.855	1.799	1.750	1.600	1.578
PROTCTV SRVC	25.401	25.456	25.918	26.301	28.[illegible]	[illegible]

TABLE 4

METRO AREA FORECAST WITH ADJUSTED PERSONAL INCOME 8-1

EMPLOYMENT BY OCCUPATION

	1982	1983	1984	1985	1990	1995
AERONAUT. ENGINEERS	1.290	1.310	1.352	1.375	1.557	1.590
CHEMICAL ENGINEERS	.802	.782	.813	.839	.960	1.038
CIVIL ENGINEERS	3.575	3.577	3.696	3.799	4.404	4.592
ELEC. ENGINEERS	8.934	9.009	9.580	10.018	11.801	13.055
IND. ENGINEERS	4.856	4.856	5.165	5.432	6.377	7.344
MECH. ENGINEERS	4.490	4.447	4.770	5.066	6.297	7.188
METAL & MTRLS ENGNRS	.281	.278	.297	.314	.368	.430
MINING-PETRO ENGNRS	.123	.121	.126	.130	.150	.165
SALES & NEC ENGNRS	4.614	4.605	4.881	5.133	6.255	7.048
COMPUTER PROGRAMMERS	6.903	6.903	7.240	7.575	9.055	10.125
COMPUTER ANALYSTS	4.462	4.465	4.701	4.932	5.941	6.698
CMPTR SPCLSTS & NEC	.882	.884	.932	.978	1.175	1.322
HEALTH TECHNOLOGISTS	11.543	11.516	11.932	12.287	14.120	15.088
NURSES. THERPSTS....	26.689	26.660	27.575	28.330	32.220	34.285
PHYS. ,DENT.....	15.257	15.217	15.723	16.147	18.257	19.426
AGRI BIO TECHNICIANS	.669	.651	.657	.666	.717	.740
~~CHEMICAL TECHNICIANS~~	~~1.203~~	~~1.155~~	~~1.190~~	~~1.221~~	~~1.394~~	~~1.468~~
DRAFTSMEN	7.691	7.693	8.177	8.583	10.371	11.649
ELECTRCL TECHNICIANS	6.102	6.149	6.544	6.861	8.183	9.088
INDUST ENGNR TECHNCS	.653	.648	.692	.729	.890	.996
MECH. ENG. TECH.	.332	.329	.356	.379	.479	.548
MATH TECHNICIANS	.038	.038	.039	.040	.044	.048
NEC TECHNICIANS	7.013	6.945	7.278	7.587	9.067	10.028
PRE K. K-6 TEACHERS	21.010	18.201	18.022	18.289	24.225	24.972
7-12 TEACHERS	20.819	18.298	18.208	18.508	24.096	24.959
EDITORS + REPORTERS	4.814	4.877	5.022	5.154	5.678	5.992
PUBLIC RELATIONS	3.355	3.352	3.472	3.593	4.173	4.488
NEC WRITERS & ARTSTS	20.070	19.940	20.846	21.618	24.974	26.982
RELIGIOUS WORKERS	6.831	6.706	7.117	7.379	8.247	8.238
SOCIAL SCIENTISTS	7.193	7.160	7.407	7.669	8.973	9.832
SOC & REC WORKERS	14.498	14.313	14.813	15.217	17.001	17.775
POST-SEC TEACHERS	7.643	6.606	6.583	6.627	8.308	9.082
ACCOUNTANTS	26.313	26.404	27.394	28.359	32.721	35.717
AIRLINE TECHNICIANS	2.131	2.109	2.157	2.203	2.417	2.550
ARCHITECTS	1.811	1.823	1.917	1.995	2.357	2.581
FARM AND ENVIRONMENT	1.373	1.335	1.340	1.357	1.499	1.617
LAWYERS AND JUDGES	16.555	16.656	17.249	17.819	20.547	22.484
LIBRARIANS	2.497	2.266	2.281	2.329	2.929	3.057
BIO & PHYS SCIENTSTS	5.632	5.564	5.751	5.941	6.910	7.500
MATH SPECIALISTS	1.143	1.142	1.177	1.216	1.398	1.504
SYSTEMS ANALYSTS	3.168	3.160	3.329	3.483	4.166	4.612
LABOR RELATION WRKRS	13.497	13.597	14.103	14.654	17.059	18.959
NEC RSRCH WRKRS	2.823	2.748	2.836	2.938	3.545	3.859
NEC TECHNCS & ENGNRS	3.973	3.949	4.017	4.108	4.590	5.029
VOCATNL & ED CNSLRS	2.941	2.671	2.674	2.723	3.412	3.578

84/08/01

METRO AREA FORECAST WITH ADJUSTED PERSONAL INCOME 8-1

EMPLOYMENT BY OCCUPATION
(CONTINUED)

	1982	1983	1984	1985	1990	1995
FINANCIAL MANAGERS	15.000	15.295	15.538	16.069	18.190	19.615
FARM PRODUCTS MANGRS	.467	.485	.489	.494	.507	.519
WHOLSL & RETL BUYERS	3.208	3.277	3.334	3.401	3.690	3.874
HEALTH ADMINISTRATRS	4.142	4.161	4.313	4.434	5.028	5.353
INSPECTORS	6.104	6.163	6.201	6.309	6.946	7.599
NEC PUBLC ADMNSTRTRS	16.456	16.480	16.501	16.868	18.561	20.318
RAILROAD CONDUCTORS	.208	.190	.190	.181	.132	.135
RESTAURANT MANAGERS	12.778	12.186	12.248	12.439	13.818	15.198
SALES MANAGERS	13.382	13.297	13.703	14.106	15.812	16.897
COLLEGE ADMNSTRTRS	.738	.638	.631	.640	.850	.877
1-12 SCHOOL ADMINS	3.604	3.114	3.080	3.124	4.133	4.282
NEC ADMINISTRATORS	132.563	132.000	137.108	141.626	160.589	172.632
SALES & ADVERT AGNTS	2.864	2.897	3.014	3.131	3.582	3.953
INSURANCE AGENTS	18.712	18.532	18.874	19.357	21.442	21.878
REAL ESTATE AGENTS	8.529	8.855	9.715	10.203	11.648	12.974
STOCK & BOND BROKRS	2.726	3.033	3.111	3.301	4.054	4.663
NEC SALES WORKERS	85.977	85.025	87.073	89.230	98.591	104.298
INSURANCE ADJUSTERS	5.684	5.637	5.742	5.892	6.544	6.719
INFO PROCESS WRKRS	22.017	22.021	22.811	23.641	27.319	29.854
SECRETARIES	88.896	88.570	91.714	94.832	109.450	118.281
NEC CLERICL & KINDRD	280.349	278.257	285.877	294.283	333.702	359.142
ELECTRIC LINEMEN	1.231	1.221	1.232	1.234	1.247	1.281
ELECTRICIANS	8.328	8.259	8.674	8.946	10.181	11.007
TELEPHONE INSTALLERS	9.475	9.053	9.246	9.377	9.827	10.626
NEC CONSTRUCTION	42.397	41.943	44.032	45.272	50.920	54.775
FORGE- & HAMMER-MEN	.274	.269	.292	.309	.373	.419
FURNITURE FINISHERS	.278	.278	.289	.296	.319	.325
LOCOMOTIVE ENGINEERS	.347	.318	.320	.309	.270	.248
MACHINISTS	10.861	10.634	11.364	12.332	15.665	18.240
REPAIR & MECHANICS	58.247	57.993	60.115	61.986	69.819	75.074
PRINTING TRADES	8.273	8.460	8.675	8.852	9.462	9.742
SHEET METAL WORKERS	2.399	2.389	2.583	2.628	3.049	3.309
TOOL AND DIE MAKERS	4.089	4.008	4.405	4.733	6.136	7.220
NEC CRAFTSMEN	54.721	54.100	56.578	58.575	67.030	72.273
MACHINE OPERATIVES	9.219	8.985	9.956	10.765	14.216	17.017
TEXTILE OPERATIVES	3.380	3.270	3.374	3.345	3.170	2.727
NEC OPERATIVES	187.135	184.939	195.818	204.061	236.542	255.171
MASS TRANSIT WORKERS	6.701	6.476	6.454	6.455	6.697	6.871
RAILROAD BRAKEMEN	.581	.535	.539	.524	.469	.439
TRUCK DRIVERS	27.531	27.016	27.388	27.875	29.802	30.732
NEC TRANSIT OPER'S	19.681	19.596	20.078	20.521	22.240	23.387
CONSTRUCT LABORERS	10.136	10.022	10.580	10.853	12.112	13.056
OTHER LABORERS	60.391	59.584	61.128	62.522	68.713	72.920
CLEANING WORKERS	54.190	53.716	55.907	57.964	67.925	73.916
FOOD SERVICE WORKERS	85.823	82.109	82.929	84.371	94.426	102.996
HEALTH ASSTS	44.045	44.182	45.771	47.041	53.318	56.738
PERSONAL SERVICE	30.834	30.553	31.846	32.812	36.692	38.130
PRIV HH WORKERS	10.299	9.564	9.283	8.962	8.498	8.071
PROTCTV SERVC	77.941	78.215	79.207	80.372	89.[illegible]	99.213

Next Steps

The preliminary projections need refinement to be consistent with the latest available information on employment in Boston, development projects (underway or scheduled), public investment plans, and other trends in the City that would be related to employment and income. We could adjust growth rates in individual sectors to reflect this current information.

The occupational projections are derived from the employment projections. Therefore, once the projections of employment and income are satisfactory, we can begin to analyze the occupational forecasts.

The projections of jobs by occupation would be most useful for neighborhood planning, evaluation of development projects, and formulating programs for job training and job placement. For example, planners could compare a neighborhood's labor force to the types of current and future jobs, or design a job training program that would concentrate on the jobs with the greatest growth potential.

The MEPA model's current output related to occupations (Tables 3 and 4) is not adequate for the BRA's planning and analytic purposes. However, Roy Williams and George Treyz of the MEPA project have confirmed that MEPA could produce the information that we need. The numbers are all currently in the MEPA model. Consequently, the MEPA staff would write new printing formats to produce the desired tables of information.

We need a series of tables related to occupational distribution by industrial sector for selected years. For example, one table would have the number of jobs by occupation for all 53 industrial sectors and all 94 occupations; another would have nine major sectors and an aggregated

list of occupations; another would have 53 sectors and aggregated occupations. We would also request the percent distributions and changes, and percent changes for selected periods. The possible combinations imply forty or more tables for each of two geographic areas. For practical use, we would select the following 23 tables for Suffolk County, and the same number for the Metro Area:

A. Occupational Distribution: Number of Jobs, by Occupation, by Industrial Sector

1. All sectors, all occupations, 1984
2. All sectors, all occupations, 1990
3. All sectors, all occupations, 1995
4. Major sectors, aggregated occupations, 1984
5. Major sectors, aggregated occupations, 1990
6. Major sectors, aggregated occupations, 1995
7. All sectors, aggregated occupations, 1984
8. All sectors, aggregated occupations, 1990
9. All sectors, aggregated occupations, 1994

B. Percent Distribution of Jobs, by Occupation, by Industrial Sector

10-15: same as 4-9 above.

C. Change in Number of Jobs, by Occupation, by Sector

16. Major sectors, aggregated occupations, 1984-1990
17. Major sectors, aggregated occupations, 1990-1995
18. All sectors, aggregated occupations, 1984-1990
19. All sectors, aggregated occupations, 1990-1995

D. Percent Change in Jobs, by Occupation, by Sector

20-23, same as 16-19 above.

The BRA and MEPA would need to enter into another contract for modifications to the MEPA model (as described above) and for access to the model on the University of Massachusetts' computer system. This arrangement would be far more practical, timely and affordable than any alternatives that would involve other econometric models or development of in-house models.

During the next twelve months and longer, the Research Department would have many applications for the MEPA model and the new occupational information. Among those applications would be analysis of the economic base and resident occupations of each neighborhood, assessment of neighborhood plans related to employment and occupations, and simulation of development projects or development policy.